ORIGINAL ARTICLE

Sociodemographic Determinants of Good Sexual and Reproductive Health (SRH) Knowledge Among Secondary School Children in Kuantan, Pahang, Malaysia

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ABSTRACT

Introduction: Adolescence being a transition phase from a child to an adult, commonly associated with high-risk sexual behaviours, which put them at risks of sexually transmitted diseases (STD), HIV and unwanted pregnancy. All these risks can be prevented by having adequate knowledge on sexual and reproductive health (SRH). Hence, this study aimed to determine the sociodemographic determinants of good SRH knowledge among secondary school children in Kuala Kuantan, Pahang Malaysia. **Methods:** A cross-sectional study was conducted among 687 secondary school children in Kuala Kuantan, Kuantan, Pahang, using self-administered questionnaire. A multistage cluster sampling was employed to recruit the respondents. Three levels of analysis were conducted to describe the characteristics of the respondents and determining the determinants of good SRH knowledge. Data was analysed using Statistical Package of IBM SPSS Statistics Version 24 and the p value was set to be less than 0.05. **Results:** The proportion with good SRH knowledge was 58.4%. Upper secondary school age group (AOR 7.142, 95% CI: 4.830, 10.560) and smokers (AOR 2.597, 95% CI: 1.348, 5.004) were found to be significant determinants of good SRH knowledge. **Conclusions:** The percentage of respondents with good SRH knowledge was just slightly above average. As expected, older school children has the strongest likelihood of having good SRH knowledge. Whether the good SRH knowledge is contributed by the existing SRH curriculum is unclear and requires further exploration. In view of the alarming SRH issues involving younger school children, strategic plan are needed to instil the knowledge at earlier age.

Keywords: Sexual and reproductive health, Knowledge, Adolescent, Malaysia

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INTRODUCTION

The World Health Organisation (WHO) defines children as period under the age of majority; 19 years, unless national law defines otherwise, and entitle adolescent as a person who is aged between 10 to 19 years old (1). During this critical phase, adolescents undergo tremendous changes, be it physically, emotionally, mentally and sexually. They undergo rapid growth in development for physical and sexual maturity (2). It is also during this period of time they are exploring their sexual interest and desire. Due to their incapability to make a sound judgment or making the right decision in life, adolescents often find themselves vulnerable to be involved in high-risk sexually related behaviour such as premarital sex (3, 4, 5), having multiple sexual partners (6, 7) and ended up with unintended pregnancy (4, 8, 9, 10).

Globally, there were 16 million girls aged 15 to 19 years had giving birth each year (11). Teenage pregnancy carries a greater risk in terms of morbidity and mortality. Marie Stope International (MSI) in 2013 suggested that adolescents aged between 15 to 19 years were two times more likely to die giving birth than 20-year-old women. Recently, it was estimated that 3.9 million adolescents in developing countries went through unsafe abortion each year (11), which endangered them for the risk of cervical tearing (12), haemorrhage (13), perforated uterus (12, 13), chronic pelvic infections (10), infertility (14, 15) and death (16, 17). Having multiple sexual partners may further increase their risk of contracting sexually transmitted diseases (STDs) particularly Human Immunodeficiency Virus (HIV) /AIDS (5, 6, 18, 19).

In Malaysia, the National Health Morbidity Survey (NHMS) III in 2006 reported 8.3% boys and 2.9% girls in the adolescent age group had experienced their first sexual event. It was increasing as compared to the previous NHMS II in 1996 whereby only 2.5% and 1.3% of respective gender were reported (20). Several studies reported that prevalence varies between

localities in Malaysia. In 2012, it ranged from 5.4% in Negeri Sembilan to as high as 12.6% in Pulau Pinang (8). In 2016, there were 12 492 cases of teenage pregnancy reported by the Family Health Development Division, Ministry of Health Malaysia (21). Similarly, there were 83 children out of wedlock registered daily at the National Registration Department of Malaysia from the year of 2006 to 2009 (22). These innocent infants were the end results from many premarital sexual acts of Malaysian adolescents.

The large numbers of teenage pregnancy and baby dumping cases in Malaysia reflect the possibility of having poor knowledge related to SRH among them. Although many of them had experienced their first sexual event at early age, their SRH knowledge are generally inadequate. A study done in 2010, reported that majority of their 1139 respondents aged 15 to 20 years in Pulau Pinang, Malaysia were not aware regarding STD's mode of transmission (18). On the other hand, a cross-sectional study conducted in 2011 among 1034 secondary school children in Kelantan concluded that only 12.7% of them answered correctly for the question whether sexual intercourse was a cause of STD or not and only 30% of them knew that sexual intercourse could result in pregnancy even in the first attempt (23). Apart from that, another cross-sectional study among 1695 female students in Klang Valley, Malaysia also summarized that knowledge regarding pregnancy was generally poor among adolescents (24).

According the recent data published from NHMS 2017, the prevalence of ever having had sex among adolescents was highest in Pahang with 9.5% as compared to national level at 7.3% (25). Based on a report on SRH health screening among school going children in Kuantan in 2016, percentage of students aged 15 years old who admitted to be involved in various high-risk sexually related behaviours ranged from 1.5% to 34% (26). There were 17.4% of them admitted to practice masturbation, 34% had either read or watched phonography, and 2% of them confessed that they had experience a sexual event. Based on the availability of published data, this study was conducted in Kuantan, Pahang. However due to logistic and resources constraints, the study location was further confined to Kuala Kuantan, which is the largest sub-district in Kuantan with the largest estimated population of 350 000 (27). This study aimed to identify knowledge related to SRH, its association with sociodemographic factors and the sociodemographic determinants of good SRH knowledge among secondary school children in Kuala Kuantan.

MATERIALS AND METHODS

A cross-sectional study was conducted from April to July 2018. A multistage cluster sampling method was employed to recruit the respondents. For stage one, nine public secondary schools in Kuala Kuantan were selected from a total of 17, based on the calculated cluster size. The nine schools were selected by simple random sampling method using Microsoft Excel software for random selection. Based on the discussions with the principal from individual selected school, only one form was allowed for data collection from a total of three forms (Form 1, 2 and 4). Stage two involved the selection of a form in the selected secondary schools in Kuala Kuantan. The form was selected using simple random sampling method. All eligible students from the selected form were included in the study. Inclusion criteria include Malaysian. Exclusion criterion include those from form three and five as it was the prerequisite by Ministry of Education, Malaysia, participants without parental consents and student from Maktab Rendah Sains Mara as the school belong to Majlis Amanah Rakyat jurisdiction.

Data was collected using a questionnaire prepared in bilingual which were Bahasa Malaysia and English languages. Two expert panels in the field of Public Health were involved in content validity to ensure adequate exploration of issues of concern prior to the conduction of a pilot test. The pilot test was conducted among 60 secondary school children checking for face validity and reliability testing of the instrument was measured with internal consistency. The overall Cronbach's alpha value was 0.72. The booklet consist of two sections namely; sociodemographic section and SRH knowledge section. The self-administered questionnaire were distributed to participants and were collected on the same day of distribution. Respondents were assured that no names would be on the booklets and all answers remained confidential. The knowledge scores was categorised into good and poor knowledge based on the median scored, 7 (IQR±4).

Data were analysed using the Statistical Package of IBM SPSS Statistics Version 24. The significance level was set at 0.05. Descriptive analysis was used to analyse the level of knowledge regarding SRH among secondary school children and socio-demographic profiles of the respondents. The Chi-square test was used in the bivariate analysis and finally the multivariate logistic regression analysis was applied to determine the sociodemographic determinants of good SRH knowledge. The findings were presented as adjusted odd ratios (AORs) with 95% confidence intervals (CIs), and a p-value less than 0.05 was considered significant. The study attained an ethical approval from the Ethics Committee for Research Involving Human Subject Universiti Putra Malaysia (JKEUPM).

RESULTS

Table I is showing the sociodemographic background of respondents. The mean (SD) age of the respondents was 14.56(1.232) years old. Majority of them were Malay (84.3%), female (58.1%) and aged 16 (39.7%). The

Table I: Sociodemographic background of respondents (N=687)

Variables	Mean ± SD	*n* (%)
Age	14.56 ± 1.232	
13		163 (23.7)
14		251 (36.5)
16		273 (39.7)
Gender		
Male		288 (41.9)
Female		399 (58.1)
Ethnicity		
Malay		579 (84.3)
Chinese		72 (10.5)
Indian		32 (4.7)
Others		4(0.6)
Smoking habit		
No		616 (89.7)
Yes		71 (10.3)
Alcohol use		
No		665 (96.8)
Yes		22 (3.2)
Drug use		
No		685 (99.7)
Yes		2 (0.3)

age distribution of respondents were as follows; Form 1 students (aged 13) 23.7%, Form 2 (aged 14) 36.5% and Form 4 students (age 16) 39.7%. The distribution of gender showed a relatively equal distribution with female slightly higher at 58.1% (n=399) from male, 41.9% (n=288). Majority of respondents were Malays at 84.3%, others were Chinese (10.5%), Indian (4.7%), and other races such as Sikh and Orang Asli (0.6%). For high-risk behaviour distribution, there were 10.3% (n=71) of respondents who admitted to smoke cigarettes, 3.2% (n=22) confessed of taking alcohol beverages and 0.3% (n=2) used drugs. Among 71 respondents who smoke cigarettes, majority of them were aged 16 (48%) and 14 (46%) years. All of them were Malays with 76% of them being males.

For SRH knowledge section, 11 items were tested and total scores ranged from 0 to 11. Respondents scored median (IQR) of 7(4) for this section. Table II shows the frequency of correct answers for each item tested in this section. Majority of respondents scored correctly for item "pregnancy only can occur when there is fertilization of ovum and sperm" with 84.9% (n=583). About 77.1% (n=530) of them knew that female who has gone through puberty may become pregnant if she has sex and 73.4% (n=504) of them were sure that (HIV) is transmitted via sexual intercourse. Respondents scored lowest for item "pregnancy may occur if there is penetration of the vagina by penis" with only 14.6% (n=100). On the other hand, there was 45.7% (n=314) of respondents believed that shower after sexual intercourse is likely to prevent pregnancy and only 56.2% (n=386) knew that menstrual blood for female comes from the wall of the uterus. Based on the median score, the SRH knowledge was later divided into good and poor knowledge as depicted in Table III. Those who scored above 7 were categorized as having good SRH knowledge and those who scored below 7 were termed as having poor knowledge regarding SRH. The sociodemographic factors of respondents studied includes gender, age, ethnicity, smoking habit, alcohol consumption and drug usage. Table IV shows an association between respondents' SRH knowledge and sociodemographic factors studied.

Table II: Correct responses to question relayed to SRH among respondents (N=687)

Item	*n*	%
Menstrual blood for female comes from the wall of the uterus.	386	56.2
The testis produces sperms.	700	72.8
Female who has gone through puberty can become pregnant if she has sex.	530	77.1
Pregnancy may occur if there is penetration of the vagina by penis.	100	14.6
Pregnancy only can occur when there is fertilization of ovum and sperm.	583	84.9
One may become pregnant even after one act of sexual intercourse.	400	58.2
Pregnancy can be prevented using condoms.	454	66.1
Shower after sexual intercourse is likely to prevent pregnancy.	314	45.7
Multiple sexual partners will increase risk of getting Sexually Transmitted Diseases (STD).	478	69.6
Human Immunodeficiency Virus (HIV) is transmitted via sexual intercourse.	504	73.4
Generally, abortion is illegal in Malaysia.	409	59.5

Table III: Level of SRH knowledge of respondents (N=687)

Variables	Median ± IQR	*n* (%)
Level of knowledge	7 ± 4	
Poor knowledge (<7)		286 (41.6)
Good knowledge (≥7)		401 (58.4)

A Chi-square test was performed and found a significant difference of SRH knowledge between male and female gender among respondents, p<0.001. Among the female respondents, a majority were having good SRH knowledge (64.4%). Meanwhile, the distribution among male respondents were equal between those having good and poor SRH knowledge. From the statistical test, there was a significant difference between the two age groups of respondents, p<0.001. Among older age group of respondents, many (84.2%) were found to

Table IV: Chi-square analysis between SRH knowledge and sociodemographic determinants of respondents (N=687)

Variables	SRH Knowledge		Test Statistics		
	Good N=401 (%)	Poor N=286 (%)	X^2	*df*	*p-value*
Gender					
Male	144 (50.0)	144 (50.0)	14.296	1	<0.001*
Female	257 (64.4)	142 (35.6)			
Age group					
13-15	171 (41.3)	243 (58.7)	124.862	1	<0.001*
16-17	270 (84.2)	43 (15.8)			
Ethnicity					
Malay	354 (61.1)	272 (38.9)	11.631	1	0.001*
Non Malay[b]	47 (43.5)	61 (56.5)			
Smoking habit					
No	344 (55.8)	272 (44.2)	15.646	1	<0.001*
Yes	57 (80.3)	11 (19.7)			
Alcohol use					
No	386 (58.0)	279 (42.0)	0.901	1	0.343
Yes	15 (68.2)	7 (31.8)			
Drug use					
No	399 (58.2)	286 (41.8)	NA		0.513[a]
Yes	2 (100.0)	0 (0.0)			

*Significant at $p < 0.05$
[a] Fisher's Exact Test
[b] Non-Malay include Chinese, Indian and Others

have better SRH knowledge. On the other hand, more than half (58.7%) of lower secondary school children were having poor SRH knowledge. As the majority of respondents were Malays (84.3%), association was examined between Malay and Non-Malay groups. The difference was significant with p=0.001. Majority of Malay respondents (61.1%) seemed to have good knowledge and as for the Non-Malay respondents, 43.5% of them was identified as having good SRH knowledge. High-risk behaviours that were studied include smoking habit, alcohol and drug usage. As depicted in Table IV, one out of three variables measured shows a significant difference in their knowledge level which was the smoking habit. Among respondents who smoke cigarettes the majority of them had good SRH knowledge (80.3%), whereas the distribution of non-smoking respondents was almost equal between poor and good SRH knowledge groups. The difference was significant with p<0.001.

The multivariate analysis was then conducted to determine the sociodemographic determinants for good SRH knowledge among secondary school children in Kuala Kuantan using the logistic regression analysis. All eligible variables with p-value less than 0.25 were introduced into the model (28). Those variables were gender, age groups, ethnicity and smoking habit. The analysis was done using a forward stepwise method to examine the likelihood ratio of variables. Omnibus tests of model coefficients were significant for the overall model and collectively explained 23.1% (Cox and Snell R2) to 31.0% (Nagelkerke R2) of the total variance in SRH knowledge. Table V shows the final model of logistic regression analysis for sociodemographic determinants of good SRH knowledge among secondary school children in Kuala Kuantan.

The final model shows upper secondary school children and smoking were the significant sociodemographic predictors for good SRH knowledge among secondary school children in Kuala Kuantan. The odds of upper secondary school children to have good SRH knowledge were more than 7 times higher than the lower secondary school children (AOR 7.142, 95% CI: 4.830, 10.560, p<0.001). Students who were smoking was found to have odds of almost 3 times higher than non-smoker students to have good SRH knowledge (AOR 2.597, 95% CI: 1.348, 5.004, p=0.004).

Table V: Final model of sociodemographic determinants of good SRH knowledge (N=687)

Variable	β	SE	Wald	*p* - value	Adjusted Odds Ratio	95% CI	
						Lower	Upper
Age Group							
13-15 years old					1		
16-17 years old	1.966	0.200	97.032	<0.001	7.142	4.830	10.560
Smoking habit							
No					1		
Yes	0.954	0.335	8.135	0.004	2.597	1.348	5.004
Constant	-1.183	0.178	44.181	<0.001	0.306		

DISCUSSION

This study found that knowledge related to SRH among secondary school children in Kuala Kuantan, Pahang, Malaysia was just above the average, with majority had correct knowledge related to organs of reproductive system mainly male reproductive system, physiology of pregnancy and HIV. Overall, Malaysian's adolescents' knowledge regarding SRH was lacking (9, 18, 23). A study conducted among 1 034 secondary school students in Kelantan, Malaysia revealed inadequate knowledge regarding a certain important aspect of SRH mainly STDs and myths about sexual intercourse (23). Similarly another study reported that sexual knowledge among 860 school going adolescents aged 13 to 18 years was relatively low (29). Majority of respondents knew that pregnancy only can occur when there is fertilization of the ovum by sperm. This study showed a better result (84.9%) than the result obtained by previous study whereby 69.6% of their respondents correctly answered the same question (23). Similarly,

both studies showed a majority of respondents, 77.1% and 70.9% respectively, answered correctly about the possibility of a female who has undergone puberty to become pregnant if she has sex. About 73% of students knew regarding the function of male reproductive organ in the present study, as compared to only 45.7% of respondents in the previous study done by Rahman et al. (23). Although many of them able to understand the anatomy of male reproductive system, only half of them (56.2%) clearly understand the physiology of menstruation. This also holds true from the previous studies that items related to female reproductive systems scored were ranged from 37% to 55% (23). Similarly, for questions regarding the menstrual cycle and the chances of getting pregnant, only 14.2% responded correctly (30). These findings show that there are issues related to the understanding of female reproductive systems as compared to the male counterpart. Basic knowledge of the physiology of reproduction and fertility is important for adolescents especially for the successful practice of sexual intercourse related methods of contraception such as periodic abstinence (31).

Although their knowledge regarding conception was correct, almost half of them (47.8%) do not know that one can become pregnant even with a single act of sexual intercourse. This result was in line with another study that found only 30% of respondents answered correctly to the same item (23) and another study also concluded that 53.5% of respondents in their study knew that a girl could get pregnant the first time she had sex (30). Likewise, many of them believed that taking shower after sexual activity can prevent pregnancy (45.7%) just like other myth of vaginal douching after sex may prevent pregnancy (17%) (23). Those misunderstanding might impose the wrong idea to them about sexual activity and lower their safe-regard about sex (23). All these misconceptions regarding SRH may further lead them to make the wrong judgement regarding their sexual practice in the future.

Many other studies agreed that adolescent's sexual knowledge was generally inadequate (17, 32). Poor knowledge about SRH could be explained by the scarcity of the issues being discussed with children. This endangered them to be involved in sexual activity without proper guidance and definite information about sexual health. Therefore good knowledge of sexual and reproductive health is paramount for adolescents not only to empower them to be able to understand and weigh the risks but also being responsible to the outcomes and consequences of their sexual actions.

There was a significant association between SRH knowledge and sociodemographic determinants studied in this study which was age, gender, ethnicity and high-risk behaviour such as smoking. Older age group was found to have a significant association with SRH knowledge among respondents. Similarly, the mean knowledge scores were significantly higher among upper secondary school children (23), better in Form 6 students as compared to Form 4 students (18) and found to be increasing with age advancement (24). This can be explained by the fact that human development will further improve cognitive function and one's ability to comprehend knowledge (10). Older children relatively gain more knowledge over time due to ample resources and great opportunities (33).

There were studies showed a relationship between high-risk behaviours such as smoking, alcohol or drug abused and one's sexual behaviour. A study conducted among 4500 adolescents in Negeri Sembilan, Malaysia concluded from his study that those who consumed alcohol were 2.7 (CI: 1.99, 3.66) times more likely to have had sexual intercourse and for cigarettes, it was 4.1 times (CI: 3.06, 5.56) higher (34). Anyhow, present study able to show a significant difference among respondents who smoke a cigarette than those who do not. Smokers were found to have better SRH knowledge. This can be partially explained by the theory of problem behaviour that concluded any involvement of adolescent in any problematic behaviour increases the likelihood of involvement in other types of problematic behaviour (35). Accordingly, those who smoke usually have more affinity for other high risk behaviours such as truancy, vandalism, bully or premarital sex (8). These arguments support the findings that those who are sexually active tend to seek more information about sex that makes those who are smoking are having better knowledge pertaining to SRH.

Ultimately, this study concluded that older age and smoking habit were the main predictors of good SRH knowledge among secondary school children. Age was found as the strongest determinant in this study. These may imply the significance of age in determining SRH knowledge level among children and adolescents. Two plausible explanations could be suggested. One, as age increases exposure to sexually related issues also increases (24). Two, their physiological changes and development of secondary sexual characteristics that are driven by hormones often encourage them to explore sexual issues through any medium available (3).

Additionally, there is a possibility that adolescents who are smoking are also involved in other high-risk behaviours as well which include sexual related high-risk behaviours such as premarital sex or multiple partners. This was clearly explained in a study done among 1 195 adolescents in Ghana, which concluded that tobacco users among respondents had a higher likelihood to have a sexual partner (OR 6.3, 95% CI: 3.3,11.9) or multiple sexual partners (OR 10.4, 95% CI: 4.4,24.6) compared to non-tobacco users (6). This aggregation of health-damaging behaviours is consistent with the theory of problem behaviour that explained the involvement in any problem behaviour such as alcohol

use, problem drinking, cigarette smoking, marijuana use, other illicit drug use, and precocious sexual intercourse, among adolescents increases the likelihood of involvement in other problem behaviours (36). The cumulative negative experiences among those who were smoking and sexually active, indirectly increase their knowledge related to the consequences of their act or they could have seek related information upon facing certain consequences of their risky acts.

CONCLUSION

In conclusion, this study revealed that the level of SRH knowledge among secondary school children in Kuala Kuantan, Pahang, Malaysia was slightly above average. Majority of respondents were Malays, females and non-smoker. SRH knowledge was found to be significantly associated with gender, age group, ethnicity and smoking habit. However, only older age group and those who smokes cigarettes were the significant predictors of good SRH knowledge among secondary school children in Kuala Kuantan. From this study, the large sample size applied aid to reduce the possibility of making type II statistical error whereby lowering chances of getting false negative results.

On the other hand, there are few limitations noted in this study. The nature of self-administered questionnaires as study instrument leads to information bias whereby respondents might be reporting the socially acceptable response especially in this study area. Besides, study design chosen also limits the interpretation due to lack of temporality and unable to show a causal relationship between predictors and SRH knowledge. Cluster sampling method used might as well reduce the representativeness of the individual sample. Other than that, due to the prerequisites by the Ministry of Education to exclude Form 3 and Form 5 students as they are the exam going candidates, it may limit to overall findings for the present study.

Findings from this study can be used as a platform to improve SRH knowledge among secondary school children in Malaysia. As an older age group shows to predict good SRH knowledge among them, intervention should focus to integrate the knowledge in primary school and even preschool era provided the content is age appropriate. Evidence also suggested that education should begin early in order to improve the coverage of age-appropriate sexual education (2). Besides, programmes should also be targeted to include knowledge related to SRH in any programmes involving the prevention of smoking among adolescents especially in schools.

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REFERENCES

1. WHO. Definition of key terms [Internet]. 2013 Aug [cited 2017 Nov 30]. Available from http://www.who.int/hiv/pub/guidelines/arv2013/intro/keyterms/en/
2. UNFPA, UNESCO, WHO. Sexual and reproductive health of young people in Asia and the Pasific: A review of issues, policies and programmes [Internet]. Bangkok: UNFPA; 2015 [cited 2018 Jun 27]. Available from https://www.unfpa.org/sexual-reproductive-health
3. Farid ND, Dahlui M, Rus CS, Aziz NA, Al-Sadat N. Early sexual initiation among Malaysian adolescents in welfare institutions: A qualitative study. Arts Social Sci J [Internet]. 2015 Oct [cited 2017 Sep 28]; 6(4):4–9. Available from http://dx.doi.org/10.4172/2151-6200.1000129
4. Kamrani MA, Zainiyah S, Hamzah A, Ahmad Z. Source of information on sexual and reproductive health among secondary schools' girls in the Klang Valley. MJPHM. 2011 [cited 2017 Sep 28]; 11(1):29–35.
5. Khalaf ZF, Low WY, Merghati-Khoei E, Ghorbani B. Sexuality education in Malaysia: Perceived issues and barriers by professionals. APJPH [Internet]. 2014 [cited 2017 Oct 24]; 26(4):358–366. Available from http://journals.sagepub.com/doi/pdf/10.1177/1010539513517258
6. Doku D. Substance use and risky sexual behaviours among sexually experienced Ghanaian youth. BMC Public Health [Internet]. 2012 [cited 2018 Jun 21]; 12:571–579. Available from http://www.biomedcentral.com/1471-2458/12/571
7. Oladeji D, Ayangunna JA. Media influence as predictors of adolescent's sexual risky behaviour in Nigeria. MOJ Womens Health [Internet]. 2017 May [cited 2018 Jun 25]; 5(1):00112. Available from http://medcraveonline.com DOI:10.15406/mojwh.2017.05.00112
8. Awaluddin SM, Ahmad NA, Saleh NM, Aris T, Kasim NM, Azlin N, et al. Prevalence of sexual activity in older Malaysian adolescents and associated factors. J Public Health Aspects [Internet]. 2015 [cited 2017 Oct 19]; 2:1. Available from http://www.hoajonline.com/journals/pdf/2055-7205-2-1.pdf DOI: 10.7243/2055-7205-2-1
9. Mustapa MC, Ismail K, Mohamad MS, Ibrahim F. Knowledge on sexuality and reproductive health of Malaysian adolescents – A short review. Procedia - Social and Behavioral Sciences [Internet].

2015 Sep [cited 2017 Sep 28]; 211:221–225. Available from http://linkinghub.elsevier.com/retrieve/pii/S1877042815054282 DOI:10.1016/j.sbspro.2015.11.088
10. Salam RA, Faqqah A, Sajjad N, Lassi ZS, Das JK, Kaufman M, et al. Improving adolescent sexual and reproductive health: A systematic review of potential interventions. J Adolesc Health [Internet]. 2016 [cited 2018 Jul 11]; 59: S11–S28. Available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5026684/pdf/main.pdf DOI: 10.1016/j.jadohealth.2016.05.022
11. Morris JL, Rushwan H. Adolescent sexual and reproductive health: The global challenges. Int J Gynecol Obstet [Internet]. 2015 [cited 2017 Sep 28];131:S40–S52. Available from http://dx.doi.org/10.1016/j.ijgo.2015.02.006
12. Furry DB. Intervention strategies for the reduction of sexual risk practices among adolescents in ethiopia. [Unpublished doctoral dissertation]. University of South Africa, South Africa. 2015 [cited 2017 Oct 24]. Available from http://uir.unisa.ac.za/bitstream/handle/10500/20291/thesis_furry%2Cdb.pdf?sequence=1&isAllowed=y
13. Graczyk K. Adolescent maternal mortality: An overlooked crisis. Advocates for Youth [Internet]. 2017 [cited on 2017 Dec 1]. Available from http://www.advocatesforyouth.org/storage/advfy/documents/fsmaternal.pdf
14. Grimes DA, Benson J, Singh S, Romero M, Ganatra B, Okonofua FE, et al. Unsafe abortion: the preventable pandemic. The Lancet [Internet]. 2006 Oct [cited 2017 Oct 24]; 4:1-13. Available from http://www.who.int/reproductivehealth/publications/general/lancet_4.pdf
15. Samkange-Zeeb FN, Spallek L, Zeeb H. Awareness and knowledge of sexually transmitted diseases (STDs) among school-going adolescents in Europe: a systematic review of published literature. BMC Public Health [Internet]. 2011 [cited 2017 Dec 24]; 11:717. Available from http://www.biomedcentral.com/1471-2458/11/727
16. Alquaiz AM, Kazi A, Muneef M. Determinants of sexual health knowledge in adolescent girls in schools of Riyadh-Saudi Arabia: a cross sectional study. BMC Women's Health [Internet]. 2013 [cited 2018 Jun 26]; 13:19. Available from http://www.biomedcentral.com/1472-6874/13/19
17. Khanal P. Adolescents knowledge and perception of sexual and reproductive health and services-a study from Nepal. [Unpublished master thesis]. University of Eastern Finland, Finland. 2016 [cited 2017 Sep 28]. Available from http://epublications.uef.fi/pub/urn_nbn_fi_uef-20160398/urn_nbn_fi_uef-20160398.pdf
18. Anwar M, Azhar S, Ahmadi K, Khan TM. Awareness of school students on sexually transmitted infections (STIs) and their sexual behavior: a cross-sectional study conducted in Pulau Pinang, Malaysia. BMC Public Health [Internet]. 2010 [cited 2017 Oct 13];10:47. Available from http://www.biomedcentral.com/1471-2458/10/47
19. Regmi P, Simkhada P, Teijlingen VE. Sexual and reproductive health status among young peoples in Nepal: opportunities and barriers for sexual health education and services utilization. Kathmandu University Medical Journal [Internet]. 2008 [cited 2018 Jun 30]; 6(22):1–5. Available from http://eprints.bournemouth.ac.uk/10147/1/KMUJ_Pramod_Sex_Reproductive_2008.pdf
20. Institute for Public Health (IPH) 2008. The Third National Health and Morbidity Survey (NHMS III) 2006, Sexual Behaviour. Ministry of Health, Malaysia. 61 p.
21. Family Health Development Division, Ministry of Health. Tackling teen pregnancy [Internet]. 2018 [cited 2018 Mac 1]. Available from http://www.infosihat.gov.my/infosihat/media/buku kecil/T/pdf/09_teen.pdf.
22. Talib J, Mamat M, Ibrahim M, Mohamad Z. Analysis on sex education in schools across Malaysia. Procedia -Social and Behavioral Sciences [Internet]. 2012 [cited 2017 Oct 14]; 59:340–348. Available from https://ac.els-cdn.com/S1877042812037329/1-s2.0-S1877042812037329-main.pdf?_tid=80d8e074-b891-11e7-ae04-00000aab0f27&acdnat=1508832253_168eb450e7bd8d9a8a626abcb1c9018c
23. Rahman AA, Rahman RA, Ibrahim MI, Salleh H, Ismail SB, Ali SH, et al. (2011). Knowledge of sexual and reproductive health among adolescents attending school in Kelantan, Malaysia. Southeast Asian J Trop Med Public Health. 2011 [cited 2017 Sep 28]; 42(3):717–725.
24. Wong LP. An exploration of knowledge, attitudes and behaviours of young multiethnic Muslim-majority society in Malaysia in relation to reproductive and premarital sexual practices. BMC Public Health [Internet]. 2012 [cited 2017 Oct 13]; 12:1. Available from http://www.biomedcentral.com/1471-2458/12/865 DOI: 10.1186/1471-2458-12-865
25. Institute for Public Health (IPH) 2017. National Health and Morbidity Survey (NHMS) 2017: Adolescent Nutrition Survey 2017, Malaysia. Ministry of Health, Malaysia. 254 p.
26. Asiah CT, Nazir JH, Raja RNN, Fatimah AM, Jaafar SA, Abbdullah Z, Ab.Ilah NH. Laporan Teknikal 2016, Jabatan Kesihatan Negeri Pahang, Malaysia. 68 p.
27. Department of Statistics, M. Statistics Yearbook Malaysia [Internet]. 2015 [cited 2017 November 15]; Available from https://web.archive.org/web/20150205090002/http://www.statistics.gov.my/portal/download_Population/files/population/03ringkasan_kawasan_PBT_Jadual1.pdf.
28. Hosmer DW, Lemeshow S. Applied Logistic

Regression (Second). United States of america: A Wiley-Interscience Publication; 2000. 92 p.
29. Nor S, Wong Y, Rozumah FP, Mariani B, Rumaya M, Mansor J. Factors related to sexual knowledge among Malaysian adolescents. Jurnal Kemanusiaan [Internet]. 2010 [cited 2018 February 15]; 16:21-32. Available from https://www.management.utm.my/download/jurnal-kemanusiaan/bil-16-dis-2010/424-factors-related-to-sexual-knowledge-among-malaysian-adolescents/file.html
30. Abajobir AA, Seme A. Reproductive health knowledge and services utilization among rural adolescents in east Gojjam zone, Ethiopia: a community-based cross-sectional study. BMC Health Services Research [Internet]. 2014 [cited 2018 Jun 21]; 14:138. Available from http://www.biomedcentral.com/1472-6963/14/138
31. Darroch JE, Woog V, Bankole A, Ashford LS. Adding it up: Costs and Benefits of Meeting the Contraceptive Needs of Adolescents [Internet]. New York: Guttmacher Institute. 2016 [cited 2018 Mac 1]. Available from https://www.guttmacher.org/report/adding-it-meeting-contraceptive-needs-of-adolescents.
32. Hoff T, Greene L, Davis J. National Survey of Adolescents and Young Adults: Sexual Health Knowledge, Attitude and Experiences [Internet]. Crlifornia: Henry J. Kaiser Family Foundation. 2006 [cited 2017 Oct 17]. Available from https://kaiserfamilyfoundation.files.wordpress.com/2013/01/national-survey-of-adolescents-and-young-adults.pdf
33. Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: A framework and promising approaches. J Adolesc Health [Internet]. 2015 [cited 2017 Dec 25]; 56(1):S7–S14. Available from http://www.sciencedirect.com/science/article/pii/S1054139X14004236
34. Lee LK, Chen PCY, Lee KK, Kaur J. Premarital sexual intercourse among adolescents in Malaysia: a cross- sectional Malaysian school survey. Singapore Med J [Internet]. 2006 [cited 2017 October 19]; 47:476–481. Available from https://www.sma.org.sg/smj/4706/4706a2.pdf
35. O'Donnell L, Stueve A, Wilson-Simmons R, Dash K, Agronick G, JeanBaptiste V. Heterosexual risk behaviors among urban young adolescents. J Early Adolesc [Internet]. 2006 [cited 2018 Jun 3]; 26(1):87–109. Available from http://journals.sagepub.com/doi/10.1177/0272431605282653
36. Donovan JE. Problem-behavior theory and the explanation of adolescent marijuana use. J Drug Issues [Internet]. 1996 [cited 2018 Jun 21]; 26(2):379–404. Available from https://journals.sagepub.com/doi/10.1177/002204269602600205